

WHAT IS CLAIMED IS

1. An apparatus for making packages (1) containing groups (2) of products wrapped with stretch film, the apparatus comprising at least the following:
 - a transporting surface (3) for conveying the groups (2) of products in a feed direction (A) and presenting a defined front face (FD);
 - a first pair of film feed stations (4, 5), located on opposite sides of the transporting surface (3);
 - a first selection carriage (6) comprising at least two units (7, 8) for forming a respective tubular length (9, 10) of film fed by the respective stations (4, 5), and means (11) for driving the first carriage (6) to and fro in a direction transversal to the feed direction (A), so as to cyclically perform the following operations:
 - forming the tubular length of film (9) on a first unit (7) outside the transporting surface (3); and at the same time,
 - positioning the other unit (8) with the respective tubular length of film (10) on it in a stretched configuration at the transporting surface (3) to form a part of the latter so as to enable feeding of the group (2) of products into the tubular length of film (10) and releasing of the tubular length of film (10) over the group (2) of products to form a wrapped package (1).
2. The apparatus according to claim 1, comprising the following,

downstream of the first pair of feed stations (4, 5) in the feed direction (A) on the transporting surface (3):

a station (12) for turning the incoming package (1) by a defined angle (α) as it moves along the transporting surface (3); and, downstream of the station (12),

a second pair of film feed stations (13, 14), located on opposite sides of the transporting surface (3);

a second selection carriage (15) comprising at least two units (16, 17) for forming a respective tubular length (18, 19) of film fed by the respective stations (13, 14), and second means (20) for driving the second carriage (15) to and fro in a direction transversal to the feed direction (A), so as to cyclically perform the following operations:

forming a third tubular length of film (18) on the third unit (16) outside the transporting surface (3); and at the same time,

positioning the fourth unit (17) with the respective fourth tubular length of film (19) on it in a stretched configuration at the transporting surface (3) to form a part of the latter so as to enable feeding of the package (1) of products into the fourth tubular length of film (19) and releasing of the fourth tubular length of film (19) over the package to form a twice-wrapped package (1).

3. An apparatus for making packages (1) containing groups (2) of products wrapped with stretch film, the apparatus comprising at least the following:

a transporting surface (3) for conveying the groups (2) of

products in a feed direction (A) and presenting a defined front face (FD);

a first pair of film feed stations (4, 5), located on opposite sides of the transporting surface (3);

a first selection carriage (6) comprising at least two units (7, 8) for forming a respective tubular length (9, 10) of film fed by the respective stations (4, 5), and means (11) for driving the first carriage (6) to and fro in a direction transversal to the feed direction (A), so as to cyclically perform the following operations:

forming the tubular length of film (9) on a first unit (7) outside the transporting surface (3); and at the same time,

positioning the other unit (8) with the respective tubular length of film (10) on it in a stretched configuration at the transporting surface (3) to form a part of the latter so as to enable feeding of the group (2) of products into the tubular length of film (10) and releasing of the tubular length of film (10) over the group (2) of products to form a wrapped package (1);

a station (12), located downstream of the aforementioned stations in the feed direction (A) and designed to turn the incoming package (1) by a defined angle (α) as it moves along the transporting surface (3); and, downstream of the station (12),

a second pair of film feed stations (13, 14), located on opposite sides of the transporting surface (3);

a second selection carriage (15) comprising at least two units (16, 17) for forming a respective tubular length (18, 19) of film fed by the respective stations (13, 14), and second means (20) for

driving the second carriage (15) to and fro in a direction transversal to the feed direction (A), so as to cyclically perform the following operations:

forming a third tubular length of film (18) on the third unit (16) outside the transporting surface (3); and at the same time,

positioning the fourth unit (17) with the respective fourth tubular length of film (19) on it in a stretched configuration at the transporting surface (3) to form a part of the latter so as to enable feeding of the package (1) of products into the fourth tubular length of film (19) and releasing of the fourth tubular length of film (19) over the package to form a twice-wrapped package (1).

4. The apparatus according to claim 1 or 2 or 3, wherein each film feed station (4, 5; 13, 14) comprises at least one roll (21) of stretch film and transporting means (22) for positioning a respective length of film (9, 10; 18, 19) at the respective forming unit (7, 8; 16, 17).
5. The apparatus according to claim 1 or 2 or 3, wherein each carriage (6, 15) comprises a mobile surface (23) for supporting the respective pair of units (7, 8; 16, 17) for forming the length (9, 10; 18, 19) and positioned at the respective end of the corresponding carriage (6, 15); the surface (23) being slidably mounted on at least one guide (24) located under the surface (23) in such a way as to enable one of the units (7, 8; 16, 17) to be moved close to the respective feed station (4, 5; 13, 14) while the other unit (7, 8;

16, 17) is positioned at the transporting surface (3), and vice versa.

6. The apparatus according to claim 1 or 2 or 3, wherein each unit (7, 8; 16, 17) for forming the tubular length of film (9, 10; 18, 19) comprises at least two pairs (25, 26) of horizontal arms around which the respective film length (9, 10; 18, 19) is wound; at least one pair of arms (25) being mobile towards and away from the respective fixed arm (26) so as to stretch the respective length of film (9, 10; 18, 19) and then release the tubular film length (9, 10; 18, 19) over the respective group (2) of products.
7. The apparatus according to claim 5, wherein each carriage (6, 15) has at least two areas (27, 28) where the respective group (2) of products is supported and passes into the respective tubular film length (9, 10; 18, 19), each such area consisting of a double plurality of superposed, counterrotating rollers (29, 30) designed to simultaneously feed out in a single feed direction (A) the product group (2) or package (1) and the respective film length (9, 10; 18, 19) wound around the group (2) or package (1) itself.
8. The apparatus according to claim 2 or 3, wherein the turning station (12) comprises two feed surfaces (31, 32) forming a cross on the transporting surface (3) so that the incoming product package (1) is stopped at a defined position and then turned by an angle (α) such that the package (1) is repositioned on the transporting

surface (3) and is ready to be overwrapped with another length of film.

9. A method for making packages (1) containing groups (2) of products wrapped with stretch film, presenting a front face (FD) and moving along a transporting surface (3) in a defined feed direction (A), the method comprising at least the following steps:

feeding at least one portion of film from a first film feed station (4), located outside the transporting surface (3), to a respective first unit (7) for forming a tubular length of film (9); and

simultaneously positioning a second forming unit (8) with a second length of film (10) on it in a stretched configuration at the transporting surface (3) to form a part of the latter, at least through first means (6) for driving and supporting the units (7, 8);

passing a group (2) of products into the second length of film (10) and then releasing the second length of film (10) over the group (2) of products, by driving the second unit (8), in order to wrap the group (2) of products;

driving the first means (6) in order to move the first unit (7), with the first tubular length of film (9) formed on it, on the transporting surface (3) so as to wrap the next group (2) of products; and

simultaneously moving the second unit (8) at a second film feed station (5) outside the transporting surface (3) so as to feed the next film portion onto the second unit (8).

10. The method according to claim 9, wherein each releasing and

wrapping step is followed by a step of feeding the package (1) out along the transporting surface (3) in the feed direction (A).

11. The method according to claim 9, wherein each releasing and wrapping step is followed by:

a step of feeding the package (1) out along the transporting surface (3) in the feed direction (A);

a step of turning the package (1) through a defined angle (α);

a third step of feeding at least one third portion of film from a third film feed station (13), located outside the transporting surface (3), to a third unit (16) for forming a third tubular length of film (18); and

simultaneously positioning a fourth forming unit (17) with a fourth length of film (19) on it in a stretched configuration at the transporting surface (3) to form a part of the latter, at least through second means (15) for driving and supporting the units (16, 17);

passing a package (1) of products into the fourth length of film (19) to form the overwrapping and then releasing the fourth length of film (19) over the package (1) of products, by driving the fourth unit (17), in order to overwrap the package (1) of products;

driving the second means (15) in order to move the third unit (16), with the third tubular length of film (18) formed on it, from the third feed station (13) to the transporting surface (3) to wrap the next package (1) of products; and

simultaneously moving the fourth unit (17) at a fourth film feed station (14) outside the transporting surface (3) so as to feed the next film portion onto the fourth unit (17).

12. The method according to claim 9 or 11, wherein the steps of passing the units (7, 8; 16, 17) from the feed stations (4, 5; 13, 14) to the transporting surface (3) include a step of stretching the film lengths (9, 10; 18, 19) in such a way that the gap created for the passage of the product group (2) is larger than the latter's front face (FD).
13. The method according to claim 9 or 11, wherein the steps of passing the units (7, 8; 16, 17) from the feed stations (4, 5; 13, 14) to the transporting surface (3) are preceded by a step of stretching the film lengths (9, 10; 18, 19) in such a way that the gap created for the passage of the product group (2) is larger than the latter's front face (FD).
14. The method according to claim 9, wherein each step of feeding the film length (9, 10; 18, 19) onto the respective forming unit (7, 8; 16, 17) is performed in an area to the side of the transporting surface (3).
15. The method according to claim 9, wherein each step of feeding the film length (9, 10; 18, 19) onto the respective forming unit (7, 8; 16, 17) is performed in areas on both sides of the transporting surface (3).